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Metal Industry Indicators

Indicators of Domestic Primary Metals, Steel, Aluminum, and Copper Activity

September 2001

The terrorist attacks that occurred on September 11 have caused uncertainty about future economic growth in the United States and other industrialized countries. The metal industry leading indexes in this report include data only through July and August and, as a result, do not reflect any effects on the metal industries from those attacks. The leading indexes computed through July and August were increasing, suggesting that primary metals activity and nonferrous metal prices were poised for a pickup in growth toward the end of the year.

With the exception of the leading index for primary aluminum, the growth rates of the metal industry leading indexes were positive in July. The growth rate of the aluminum mill products leading index was especially strong, with a growth rate over 8.0%. The growth rate of the steel leading index was above +1.0%, which usually signals an upward near-term trend in industry activity, while the growth rate of the primary metals leading index, which anticipates ferrous and nonferrous metals activity, hovered near 1.0% in June and July. In August, with only 4 of its 8 components in the index, the growth rate of the primary metals leading index rose to 2.3%. In July, the growth rate of the copper leading index broke into positive territory for the first time in 21 months. (Tables and charts for the primary aluminum indexes are in a separate file.)

This improvement in growth has occurred since the second half of last year. Except for aluminum mill products, the growth rates of the industry leading indexes hit their most recent lows in October 2000. The recent low in the growth rate for aluminum mill products occurred in July 2000.

The metals price leading index advanced 0.6% in July, and its 6-month smoothed growth rate rose to 3.4%, the highest since March 1999. The other indicator of future metals price growth, the 6-month smoothed growth rate of the inflation-adjusted value of U.S. nonferrous metal products inventories, moved down in July. This growth rate, which moves inversely with metal prices, fell to -6.9% from a revised -5.1% in June. The July growth rate was the lowest since February 1995.

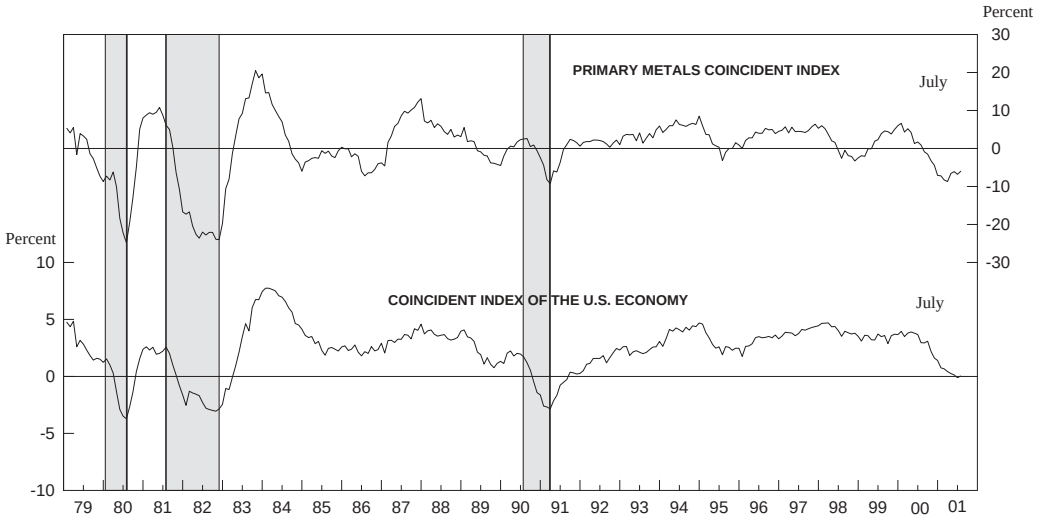
Economic developments since the events of September 11 have prompted many economists to lower their forecasts of growth in the U.S. economy and in many instances to predict recessions in the United States and other countries. The U.S. primary metals industry has been in recession since the middle of 2000, but the latest leading and coincident indexes show this recession bottoming out. Small declines in metal industry growth have not always been associated with economy-wide recessions. However, the chart on page 2 shows that large declines in metal industry growth have been linked to past U.S. recessions. It should be remembered that the U.S. economy was barely growing before the terrorist incidents occurred.

The metal industry leading indexes were signaling an upturn in activity to start no later than early 2002. These trends have been confirmed for some regions of the United States by the latest "beige book" survey of the Federal Reserve Board. It reports that the decline in metals activity in some districts slowed in recent weeks and could possibly improve over the next 6 to 12 months. However, this survey took place before September 11.

It will be at least two or three months before the economic effects from the terrorist disaster begin to filter into the data used in the metal industry indexes. The following are the most important near-term indicators that could signal significant changes in metals activity: New orders for metal products, motor vehicle sales, the Purchasing Managers' Index, and the future direction of growth in the world economy measured by the Economic Cycle Research Institute's 16-Country Long Leading Index.

For a recession to occur in the United States, economic activity in most industries will have to decline significantly for at least 6 months.

Severe drops in the growth of primary metals activity have been linked to past U.S. recessions



Shaded areas are business cycle recessions. The growth rates are expressed as compound annual rates based on the ratio of the current month's index to its average level during the preceding 12 months.

Sources: U.S. Geological Survey and Conference Board

Table 1.
Leading Index of Metal Prices and Growth Rates of the Nonferrous Metals Price Index, Inventories of Nonferrous Metal Products, and Selected Metal Prices

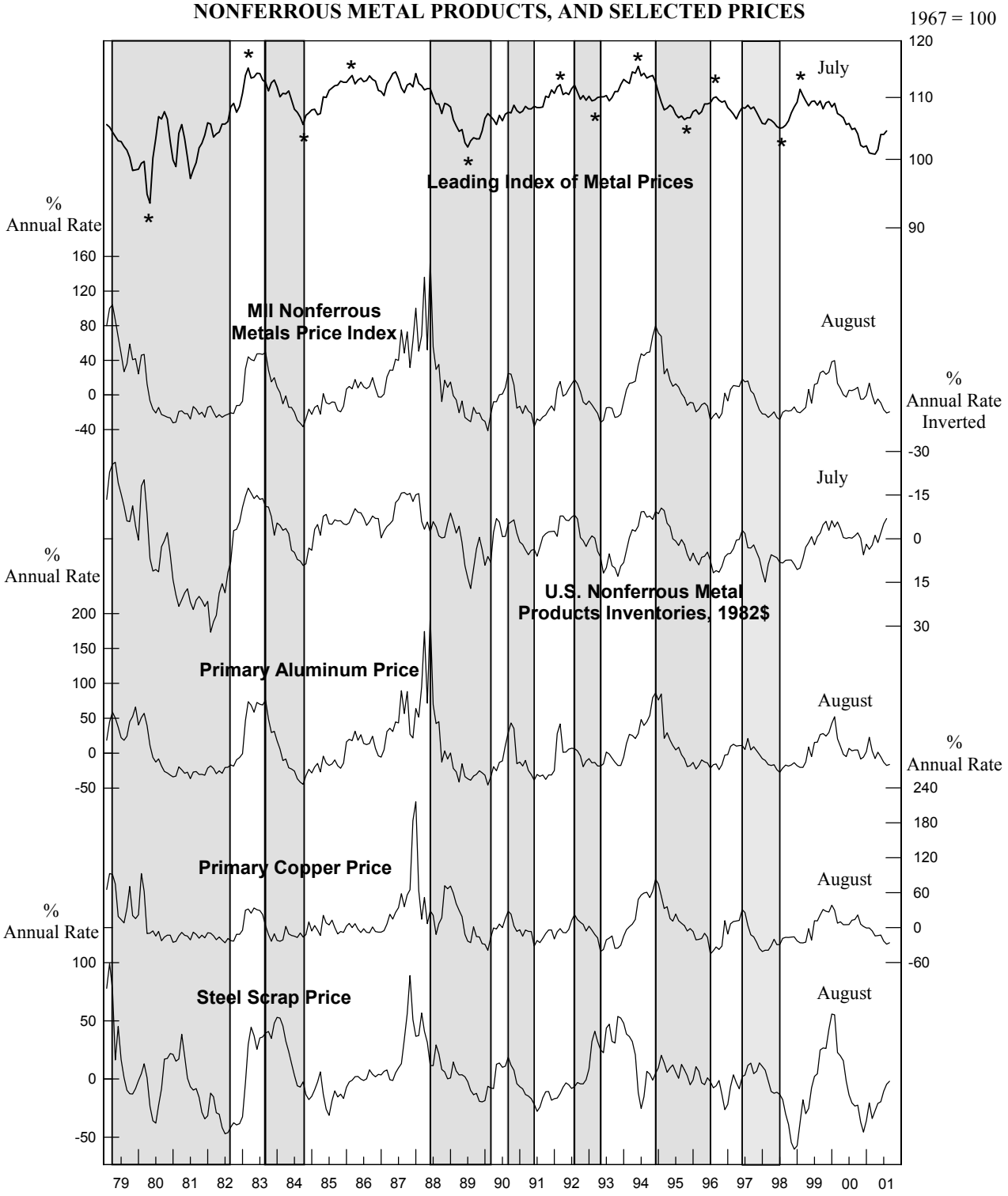
		Six-Month Smoothed Growth Rates				
	Leading Index of Metal Prices (1967=100)	MII Nonferrous Metals Price Index	U.S. Nonferrous Metal Products Inventories (1982$)	Primary Aluminum	Primary Copper	Steel Scrap
2000						
July	104.7r	5.1	-0.2	3.3	12.4	-20.5
August	104.9r	6.6	-1.0	4.4	13.9	-23.2
September	104.0r	8.9	-2.0	4.5	21.7	-22.4
October	102.2r	-4.9	-0.1	-8.4	5.7	-37.0
November	101.9r	-4.7	5.5	-5.7	1.8	-45.6
December	102.1r	-0.5	1.9	2.1	-0.7	-35.9
2001						
January	101.0	13.7	3.6	22.7	-0.8	-20.4
February	100.9	-0.5	2.2	3.0	-5.8	-34.0
March	100.8r	-10.5	-1.2	-7.8	-14.4	-27.2
April	101.5r	-4.5	1.3	1.5	-13.8	-21.0
May	103.9r	-9.0	-1.9	-5.3	-12.8	-19.5
June	103.9r	-17.0	-5.1r	-13.1	-23.3	-10.6
July	104.5	-20.9	-6.9	-17.7	-28.5	-4.5
August	NA	-19.4	NA	-16.2	-26.1	-2.0

NA: Not available *r: Revised*

Note: The components of the Leading Index of Metal Prices are the spread between the U.S. 10-year Treasury Note and the federal funds rate, and the 6-month smoothed growth rates of the deflated value of new orders for nonferrous metal products, the Economic Cycle Research Institute's 16-Country Long Leading Index, and the reciprocal of the trade-weighted average exchange value of the U.S. dollar against other major currencies. The Metal Industry Indicators (MII) Nonferrous Metals Price Index measures changes in end-of-the-month prices for primary aluminum, copper, lead, and zinc traded on the London Metal Exchange (LME). The steel scrap price used is the price of No. 1 heavy melting. Inventories consist of the deflated value of finished goods, work in progress, and raw materials for U.S.-produced nonferrous metal products (NAICS 3313, 3314, & 335929). Six-month smoothed growth rates are based on the ratio of the current month's index or price to its average over the preceding 12 months, expressed at a compound annual rate.

Sources: U.S. Geological Survey (USGS); American Metal Market (AMM); the London Metal Exchange (LME); U.S. Census Bureau; the Economic Cycle Research Institute, Inc. (ECRI); and Federal Reserve Board.

CHART 1.
LEADING INDEX OF METAL PRICES AND GROWTH RATES OF NONFERROUS METALS PRICE INDEX, INVENTORIES OF NONFERROUS METAL PRODUCTS, AND SELECTED PRICES



Shaded areas are downturns in the nonferrous metals price index growth rate. Asterisks (*) are peaks and troughs in the economic activity reflected by the leading index of metal prices. Scale for nonferrous metal products inventories is inverted.

U.S. Geological Survey, September 2001

Table 2.
The Primary Metals Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
2000				
September	126.3	-4.0	115.9	-1.5
October	123.6	-7.4	114.9	-3.2
November	123.5	-6.7	114.1	-4.4
December	122.9	-6.8	112.2	-7.1
2001				
January	123.2	-5.3	111.7	-7.2
February	122.6	-5.2	110.5	-8.3
March	123.3	-3.4	109.7	-8.7
April	124.6r	-0.9r	110.4r	-6.6r
May	125.1r	0.5r	110.1r	-6.1r
June	125.4r	1.3r	109.1r	-6.8r
July	124.9r	0.7r	109.0	-6.0
August	125.8	2.3	NA	NA

NA: Not available ***r:*** *Revised*

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

Table 3.
The Contribution of Each Primary Metals Index Component to the Percent Change in the Index from the Previous Month

Leading Index	**July**	**August**
1. Average weekly hours, primary metals (SIC 33)	0.0r	-0.4
2. S&P stock price index, machinery, diversified	-0.2r	0.2
3. Ratio of price to unit labor cost (SIC 33)	-0.1	NA
4. JOC-ECRI metals price index growth rate	-0.1r	-0.2
5. New orders, primary metal products, (NAICS 331 & 335929) 1982$	-0.1	NA
6. Index of new private housing units authorized by permit	-0.1	NA
7. Growth rate of U.S. M2 money supply, 1996$	0.2	NA
8. Purchasing Managers' Index	-0.2r	1.2
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	-0.6r	0.8

Coincident Index	**June**	**July**
1. Industrial production index, primary metals (SIC 33)	-0.4r	0.0
2. Total employee hours, primary metals (SIC 33)	0.0r	-0.5
3. Value of shipments, primary metals products, (NAICS 331 & 335929) 1982$	-0.6	0.3
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	-0.9	-0.1

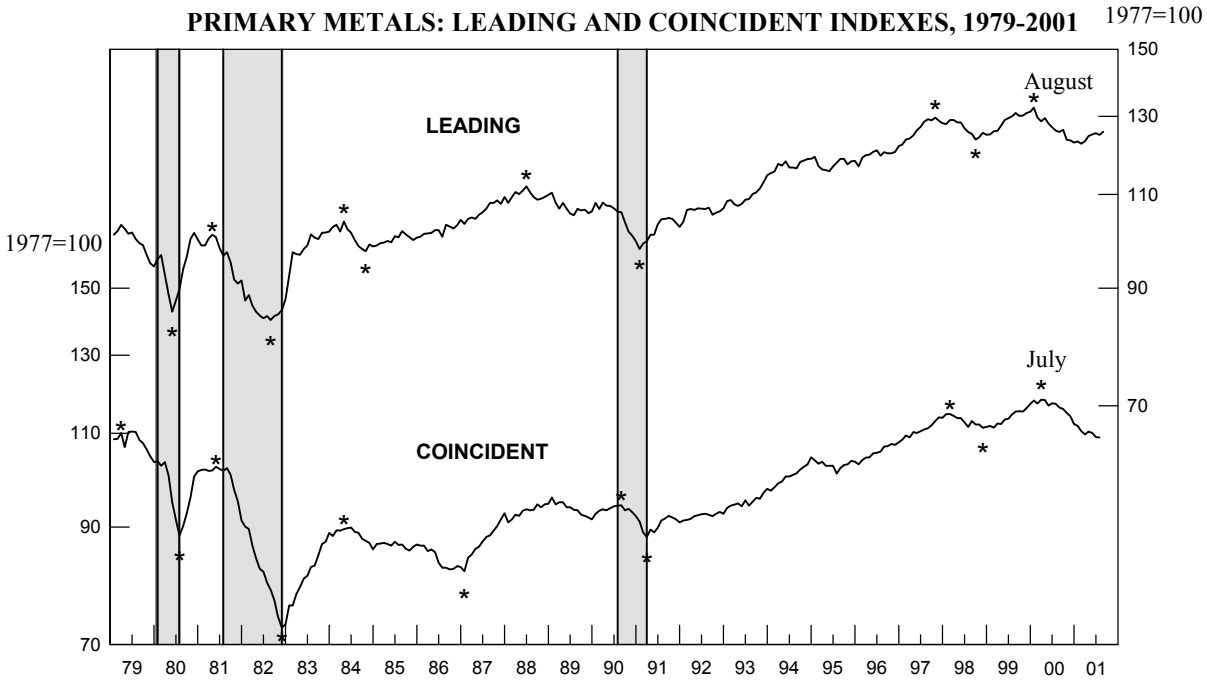
Sources: Leading: 1, Bureau of Labor Statistics; 2, Standard & Poor's; 3, U.S. Geological Survey; 4, Journal of Commerce and Economic Cycle Research Institute, Inc.; 5, U.S. Census Bureau and U.S. Geological Survey; 6, U.S. Census Bureau and U.S. Geological Survey; 7, Federal Reserve Board, Conference Board, and U.S. Geological Survey; and 8, National Association of Purchasing Management. Coincident: 1, Federal Reserve Board; 2, Bureau of Labor Statistics and U.S. Geological Survey; 3, U.S. Census Bureau and U.S. Geological Survey. All series are seasonally adjusted, except 2, 3, and 4 of the leading index.

NA*: Not available* ***r:*** *Revised*

Note: A component's contribution, shown in Tables 3, 5, 7, and 9, measures its effect, in percentage points, on the percent change in the index. Each month, the sum of the contributions plus the trend adjustment equals (except for rounding differences) the index's percent change from the previous month.

CHART 2.

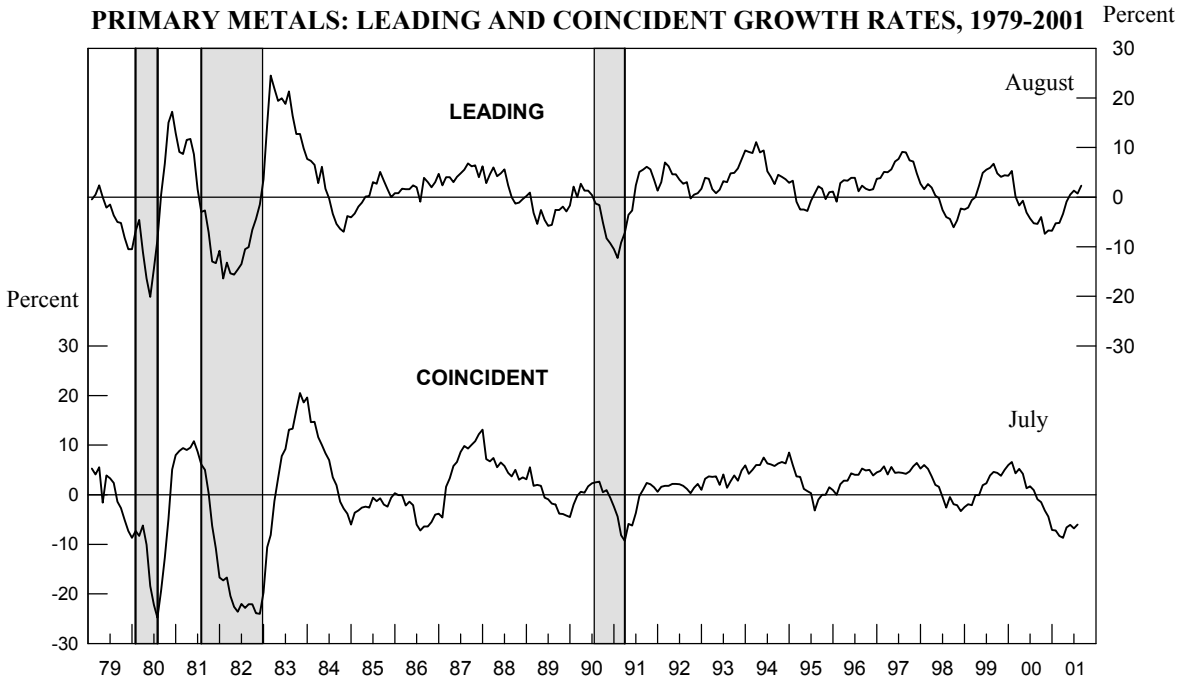
PRIMARY METALS: LEADING AND COINCIDENT INDEXES, 1979-2001



Shaded areas are business cycle recessions. Asterisks (*) signify peaks (the end of an expansion) and troughs (the end of a downturn) in the economic activity reflected by the indexes.

CHART 3.

PRIMARY METALS: LEADING AND COINCIDENT GROWTH RATES, 1979-2001



Shaded areas are business cycle recessions.

The growth rates are expressed as compound annual rates based on the ratio of the current month's index to its average level during the preceding 12 months.

U.S. Geological Survey, September 2001

Table 4.
The Steel Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
2000				
August	108.5	-6.1	103.4	-1.2
September	108.4	-5.4	103.1	-1.9
October	106.1	-8.8	102.0	-3.9
November	106.1	-8.0	101.4	-4.6
December	105.3	-8.2	99.7	-7.2
2001				
January	106.4	-5.3	99.3	-7.3
February	106.5	-3.9	98.9	-7.2
March	107.6	-1.1	98.8	-6.6
April	108.7r	1.3	99.5	-4.5
May	109.4r	3.0r	100.0r	-2.9r
June	110.3r	4.9r	99.5r	-3.1r
July	108.6	1.7	99.0	-3.2

r: Revised

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

Table 5.
The Contribution of Each Steel Index Component to the Percent Change in the Index from the Previous Month

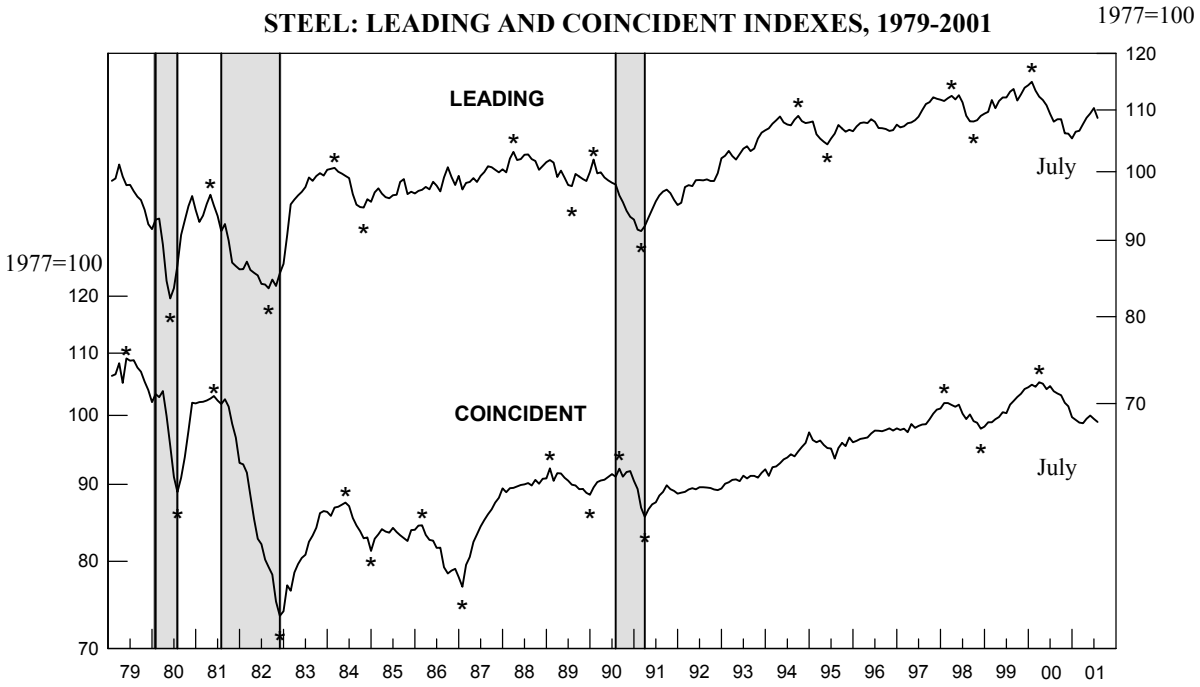
Leading Index	**June**	**July**
1. Average weekly hours, blast furnaces and basic steel products (SIC 331)	0.4	-0.5
2. New orders, iron and steel mills (NAICS 3311 & 3312), 1982$	0.0	-0.1
3. Shipments of household appliances, 1982$	-0.4	-0.7
4. S&P stock price index, steel companies	0.1	-0.1
5. Retail sales of U.S. passenger cars and light trucks (units)	0.2	-0.2
6. Growth rate of the price of steel scrap (#1 heavy melting, $/ton)	0.2	0.1
7. Index of new private housing units authorized by permit	-0.1	-0.1
8. Growth rate of U.S. M2 money supply, 1996$	0.2r	0.2
9. Purchasing Managers' Index	0.4	-0.2
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	1.0r	-1.6
Coincident Index		
1. Industrial production index, basic steel and mill products (SIC 331)	0.0r	0.0
2. Value of shipments, iron and steel mills (NAICS 3311 & 3312), 1982$	-0.6	0.3
3. Total employee hours, blast furnaces and basic steel products (SIC 331)	0.0	-0.8
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	-0.5r	-0.4

Sources: Leading: 1, Bureau of Labor Statistics; 2, U.S. Census Bureau and U.S. Geological Survey; 3, U.S. Census Bureau and U.S. Geological Survey; 4, Standard & Poor's; 5, U.S. Bureau of Economic Analysis and American Automobile Manufacturers Association; 6, Journal of Commerce and U.S. Geological Survey; 7, U.S. Census Bureau and U.S. Geological Survey; 8, Federal Reserve Board, Conference Board, and U.S. Geological Survey; and 9, National Association of Purchasing Management. Coincident: 1, Federal Reserve Board; 2, U.S. Census Bureau and U.S. Geological Survey; 3, Bureau of Labor Statistics and U.S. Geological Survey. All series are seasonally adjusted, except 4 and 6 of the leading index.

r: Revised

CHART 4.

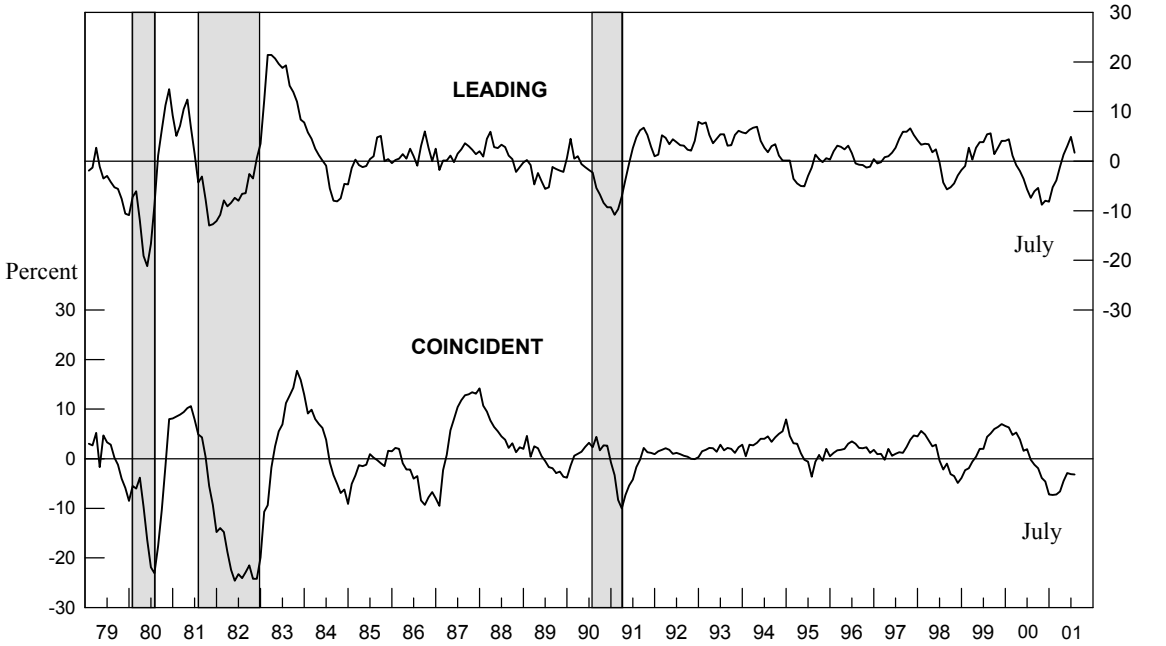
STEEL: LEADING AND COINCIDENT INDEXES, 1979-2001



Shaded areas are business cycle recessions. Asterisks (*) signify peaks (the end of an expansion) and troughs (the end of a downturn) in the economic activity reflected by the indexes.

CHART 5.

STEEL: LEADING AND COINCIDENT GROWTH RATES, 1979-2001



Shaded areas are business cycle recessions.

The growth rates are expressed as compound annual rates based on the ratio of the current month's index to its average level during the preceding 12 months.

U.S. Geological Survey, September 2001

Table 6.
The Aluminum Mill Products Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
2000				
August	157.1	-0.7	144.3	0.2
September	158.5	1.2	142.5	-2.1
October	155.0	-2.9	142.0	-2.8
November	155.9	-1.7	139.8	-5.4
December	157.0	-0.3	144.0	0.1
2001				
January	160.2	3.6	146.0	2.7
February	161.8	5.4	142.9	-1.3
March	162.2	5.7	142.0	-2.4
April	164.7	8.3r	149.0r	7.0r
May	163.4r	6.1r	146.8r	3.7r
June	166.6r	9.2r	143.3r	-1.0r
July	167.1	8.8	145.8	2.3

r: Revised

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

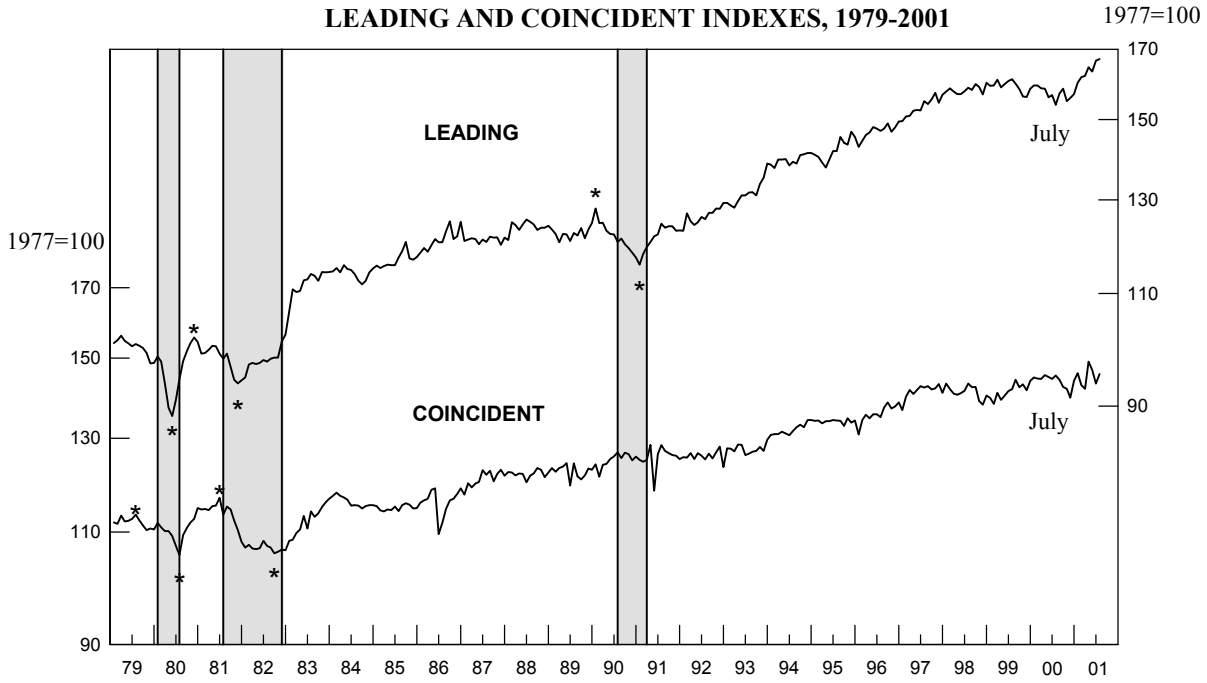
Table 7.
The Contribution of Each Aluminum Mill Products Index Component to the Percent Change in the Index from the Previous Month

Leading Index	**June**	**July**
1. Average weekly hours, aluminum sheet, plate, and foil (SIC 3353)	0.1	1.1
2. Index of new private housing units authorized by permit	-0.1	-0.1
3. Retail sales of U.S. passenger cars and light trucks (units)	0.2	-0.2
4. Construction contracts, commercial and industrial (square feet)	0.4	-0.2
5. Net new orders for aluminum mill products (pounds)	0.5	-0.5
6. Growth rate of U.S. M2 money supply, 1996$	0.2r	0.3
7. Purchasing Managers' Index	0.5	-0.2
Trend adjustment	0.2	0.2
Percent change (except for rounding differences)	2.0r	0.4
Coincident Index		
1. Industrial production index, aluminum sheet, plate, and foil (SIC 3353)	-2.0r	0.5
2. Total employee hours, aluminum sheet, plate, and foil (SIC 3353)	-0.6	1.0
Trend adjustment	0.2	0.2
Percent change (except for rounding differences)	-2.4r	-1.7

Sources: Leading: 1, Bureau of Labor Statistics; 2, U.S. Census Bureau and U.S. Geological Survey; 3, U.S. Bureau of Economic Analysis and American Automobile Manufacturers Association; 4, F.W. Dodge, Division of McGraw-Hill Information Systems Company; 5, The Aluminum Association, Inc. and U.S. Geological Survey; 6, Federal Reserve Board, Conference Board, and U.S. Geological Survey; 7, National Association of Purchasing Management. Coincident: 1, Federal Reserve Board; 2, Bureau of Labor Statistics and U.S. Geological Survey. All series are seasonally adjusted.

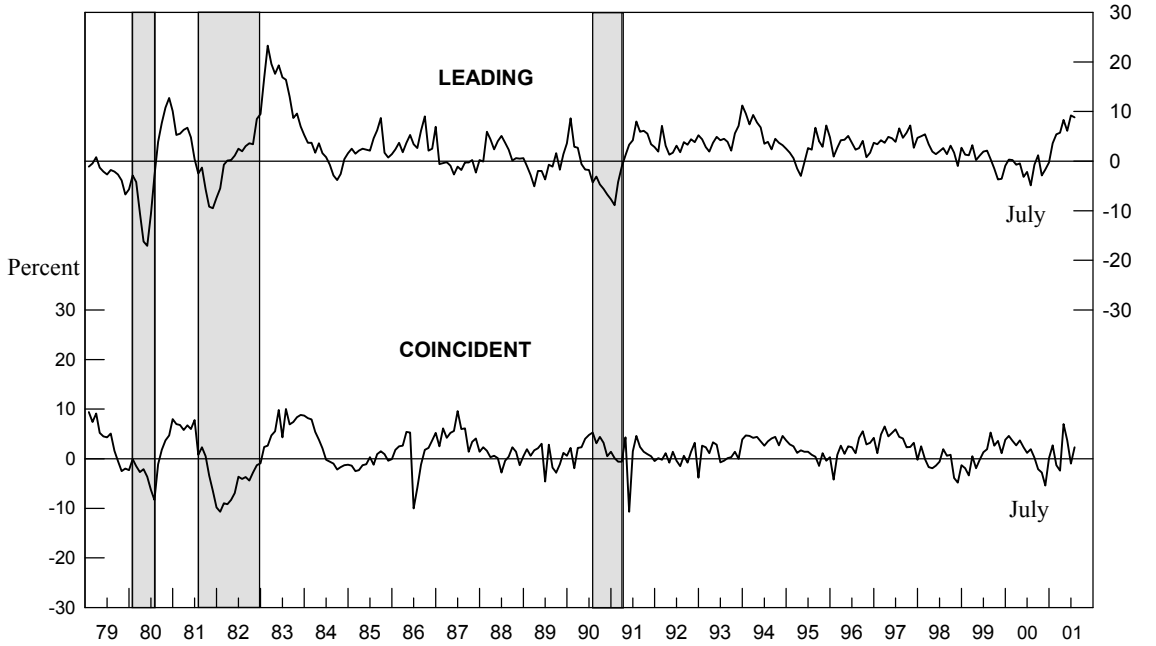
r: Revised

CHART 6.
ALUMINUM MILL PRODUCTS:
LEADING AND COINCIDENT INDEXES, 1979-2001



Shaded areas are business cycle recessions. Asterisks (*) signify peaks (the end of an expansion) and troughs (the end of a downturn) in the economic activity reflected by the indexes.

CHART 7.
ALUMINUM MILL PRODUCTS:
LEADING AND COINCIDENT GROWTH RATES, 1979-2001



Shaded areas are business cycle recessions.

The growth rates are expressed as compound annual rates based on the ratio of the current month's index to its average level during the preceding 12 months.

U.S. Geological Survey, September 2001

Table 8.
The Copper Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
2000				
August	115.8	-5.1	122.8	-0.7
September	115.2	-5.3	123.1	-0.1
October	113.2	-7.4	122.2	-1.2
November	113.6	-5.8	122.8	-0.2
December	114.0	-4.3	118.7	-6.2
2001				
January	115.6	-0.9	119.7	-4.2
February	114.2	-2.4	125.1	4.3
March	112.4	-4.9	123.6	1.8
April	111.8	-5.1	121.5r	-1.3r
May	114.2	-0.5	122.1r	-0.4r
June	113.7	-1.0r	121.1r	-1.7r
July	114.5	0.7	122.6	0.9

r: Revised

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

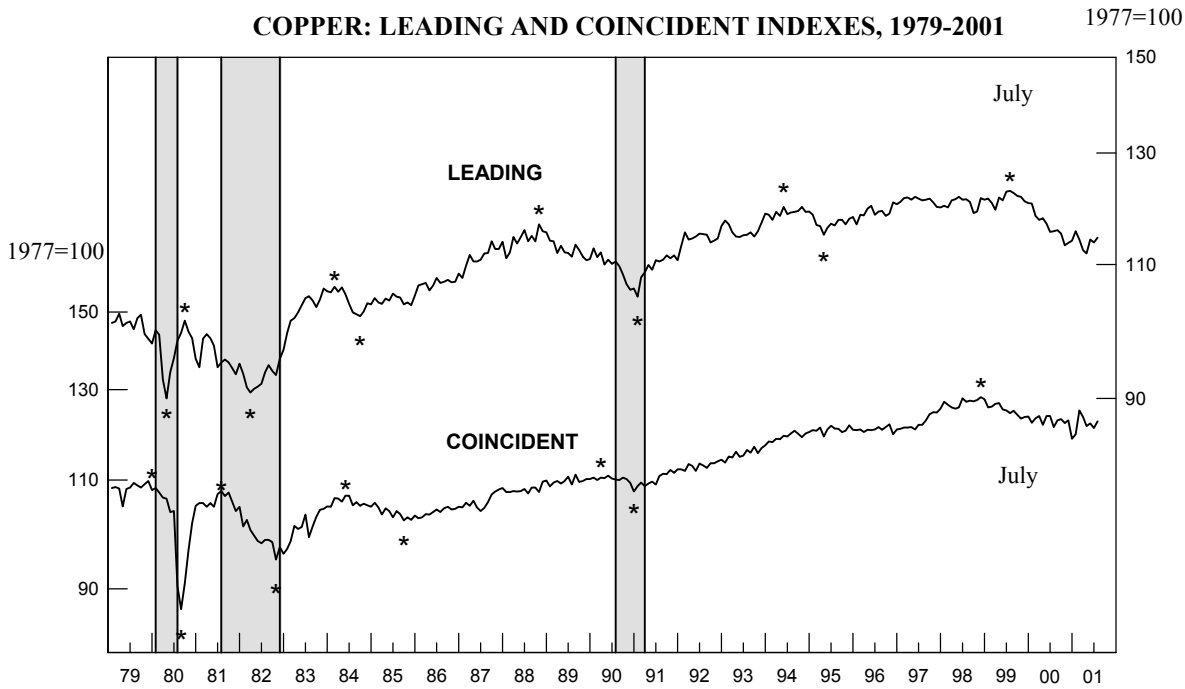
Table 9.
The Contribution of Each Copper Index Component to the Percent Change in the Index from the Previous Month

Leading Index	**June**	**July**
1. Average weekly overtime hours, rolling, drawing, and extruding of copper (SIC 3351)	-0.3	0.7
2. New orders, nonferrous metal products, (NAICS 3313, 3314, & 335929) 1982$	-0.3r	0.1
3. S&P stock price index, building materials companies	0.4	0.2
4. LME spot price of primary copper	-0.4	-0.3
5. Index of new private housing units authorized by permit	-0.1	-0.1
6. Spread between the U.S. 10-year Treasury Note and the federal funds rate	0.1	0.1
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	-0.6r	0.7
Coincident Index		
1. Industrial production index, primary smelting and refining of copper (SIC 3331)	-0.1r	0.2
2. Total employee hours, rolling, drawing, and extruding of copper (SIC 3351)	-1.0r	1.0
3. Copper refiners' shipments (short tons)	0.2	NA
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	-0.8r	1.3

Sources: Leading: 1, Bureau of Labor Statistics; 2, U.S. Census Bureau and U.S. Geological Survey; 3, Standard & Poor's; 4, London Metal Exchange; 5, U.S. Census Bureau and U.S. Geological Survey; 6, Federal Reserve Board and U.S. Geological Survey. Coincident: 1, Federal Reserve Board; 2, Bureau of Labor Statistics; 3, American Bureau of Metal Statistics, Inc. and U.S. Geological Survey. All series are seasonally adjusted, except 3, 4, and 6 of the leading index.

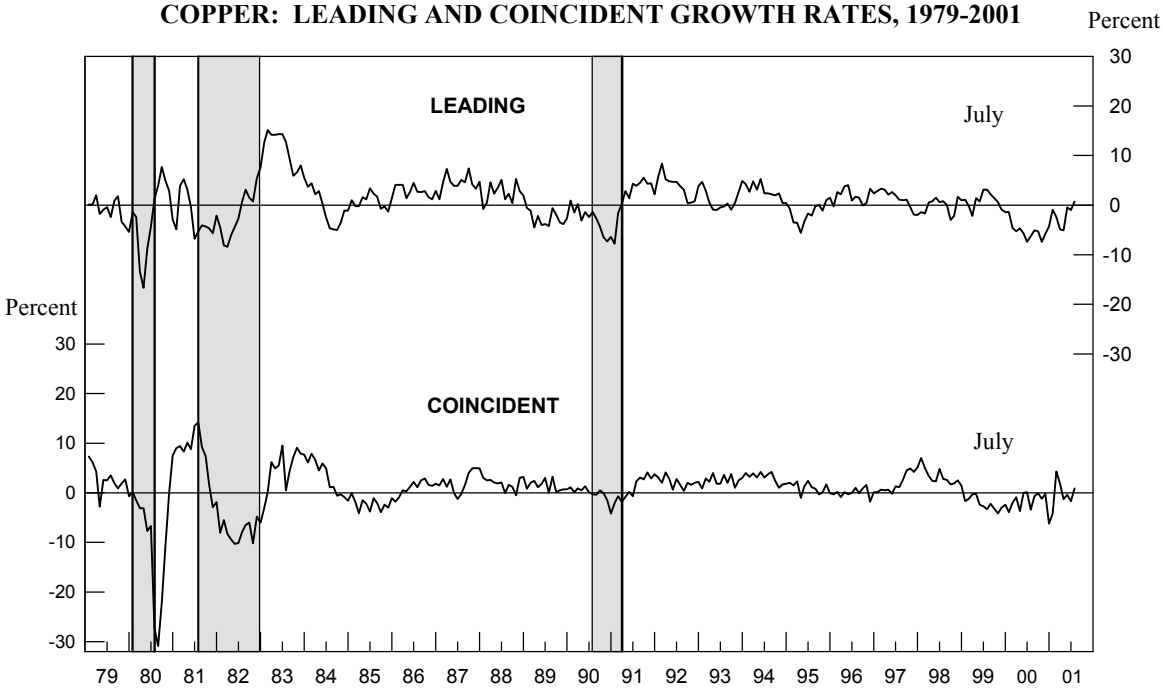
r: Revised *NA: Not Available*

CHART 8.
COPPER: LEADING AND COINCIDENT INDEXES, 1979-2001



Shaded areas are business cycle recessions. Asterisks (*) signify peaks (the end of an expansion) and troughs (the end of a downturn) in the economic activity reflected by the indexes.

CHART 9.
COPPER: LEADING AND COINCIDENT GROWTH RATES, 1979-2001



Shaded areas are business cycle recessions.

The growth rates are expressed as compound annual rates based on the ratio of the current month's index to its average level during the preceding 12 months.

U.S. Geological Survey, September 2001

Explanation

Each month, the U.S. Geological Survey tracks the effects of the business cycle on five U.S. metal industries by calculating and publishing composite indexes of leading and coincident indicators. Wesley Mitchell and Arthur Burns originated the cyclical-indicators approach for the economy as a whole at the National Bureau of Economic Research in the mid-1930s. Over subsequent decades this approach was developed and refined, mostly at the National Bureau, under the leadership of Geoffrey H. Moore.[1]

A business cycle can briefly be described as growth in the level of economic activity followed by a decline succeeded by further growth. These alternating periods of growth and decline do not occur at regular intervals. Composite indexes, however, can help determine when highs and lows in the cycle might occur. A composite index combines cyclical indicators of diverse economic activity into one index, giving decision makers and economists a single measure of how changes in the business cycle are affecting economic activity.

The indicators in the metal industry leading indexes historically give signals several months in advance of major changes in a coincident index, a measure of current metal industry activity. Indicators that make up the leading indexes are, for the most part, measures of anticipations or new commitments to various economic activities that can affect the metal industries in the months ahead.

Composite coincident indexes for the metal industries consist of indicators for production, shipments, and total employee hours worked. As such, the coincident indexes can be regarded as measures of the economic health of the metal industries.

The metal industry coincident indexes reflect industry activity classified by the U.S. Standard Industrial Classification (SIC) and the North American Industry Classification System (NAICS). Of the five metal industries, primary metals (NAICS 331) is the broadest, containing 25 different metal processing industries. Steel, aluminum, and copper are specific industries within the primary metals group.

The SIC was the main vehicle used by the U.S. Government and others in reporting industry economic statistics throughout most of the last century. Starting with the 1997 U.S. Economic Census, the U.S. Government began using the NAICS, which classifies economic data for industries in Canada, Mexico, and the United States. In general, metal industry indexes starting in 1997 begin to reflect the NAICS classification, while indexes for earlier years follow the SIC. Hence, composite indexes from 1997 forward are not entirely consistent with those of earlier years.

The largest change to primary metals because of the NAICS deals with other communication and energy wire manufacturing (NAICS 335929). Under NAICS, this manufacturing has been removed from primary metals and added to electrical equipment, appliance, and component manufacturing. Because monthly shipments and new orders for this wire are not available, the USGS is estimating their values from 1997 onward and adding them to the appropriate metal industry indicators and indexes to maintain consistency.

[1]**Business Cycle Indicators, A monthly report from The Conference Board** (March 1996).

There are other small changes to the primary metals industry because of the switch to the NAICS. Coke oven activity not done by steel mills, for example, is removed and alumina refining, a part of industrial inorganic chemical manufacturing under the SIC, is added. Since the historic trends of the composite indexes are not affected by these small changes, the USGS is not making specific adjustments to the indexes for them for the periods before and after 1997.

The metal industry leading indexes turn before their respective coincident indexes an average of 8 months for primary metals and 7 months for steel and copper. The average lead time for the primary aluminum leading index is 6 to 8 months, and the average lead time for the aluminum mill products leading index is 6 months.

The leading index of metal prices, also published in the *Metal Industry Indicators*, is designed to signal changes in a composite index of prices for primary aluminum, copper, lead, and zinc traded on the London Metal Exchange. On average, this leading index indicates significant changes in price growth about 8 months in advance.

The growth rate used in the *Metal Industry Indicators* is a 6-month smoothed growth rate at a compound annual rate, calculated from a moving average. Moving averages smooth fluctuations in data over time so that trends can be observed. The 6-month smoothed growth rate is based upon the ratio of the latest monthly value to the preceding 12-month moving average.

$$\left[\left(\frac{\text{current value}}{\text{preceding 12-month moving average}}\right)^{\frac{12}{6.5}} - 1.0\right] * 100$$

Because the interval between midpoints of the current month and the preceding 12 months is 6.5 months, the ratio is raised to the 12/6.5 power to derive a compound annual rate.

The growth rates measure the near-term industry trends. They, along with other information about the metal industries and the world economy, are the main tools used to determine the outlook of the industries. A 6-month smoothed growth rate above +1.0% usually means increasing growth; a rate below -1.0% usually means declining growth.

The next summary is scheduled for release on MINES FaxBack at 10:00 a.m. EDT, Friday, October 19. Access MINES FaxBack from a touch-tone telephone attached to a fax machine by dialing 703-648-4999. The address for *Metal Industry Indicators* on the World Wide Web is: http://minerals.usgs.gov/minerals/pubs/mii/

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